UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/057,624	10/25/2001	James G. Shelnut	50455	2203

21874 7590 04/05/2004

EDWARDS & ANGELL, LLP
P.O. BOX 55874
BOSTON, MA 02205

EXAMINER	
TALBOT, BRIAN K	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 04/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

Office Action Summary	Application No.	Applicant(s)	
	10/057,624	SHELNUT, JAMES G.	
	Examiner	Art Unit	
	Brian K Talbot	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 27-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 27-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/15/04 has been entered.

2. Claims 8-26 and 34 have been canceled. Claims 1-7 and 27-33 remain in the application.

Claim Rejections - 35 USC § 103

Claims 1-4,6,7,27-30,32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (6,277,263) in combination with Rapoport et al. (5,298,687) further in combination with Applicant's admitted state of the art (specification, pg. 2).

Chen (6,277,263) teaches method for electrolytically depositing copper on a semiconductor. A copper bath is utilized to electroplate copper onto a seed layer or to enhance an ultra-thin copper seed layer, which has been deposited on a barrier layer by PVD. When used for seed layer enhancement, the resulting copper seed layer provides an excellent conformal copper coating that allows the microstructures to be filled with copper layer having good uniformity (see abstract). The substrate can have vias or trenches lined with a barrier layer.

Chen (6,277,263) fail to teach the use of a conductive polymer for the seed layer.

Rapoport et al. (5,298,687) teaches a multilayer interconnect system and method of manufacturing. Looking at figs. 1-2, a first metal seed layer (2) is applied to a substrate (1). Next a second seed layer (4) is applied to create a continuous seed layer prior to subsequent depositing. The seed layer is a conductive polymer (col. 3, lines 40-62).

Therefore, it would have been obvious for one skilled in the art at the time the invention was made to have modified Chen (6,277,263) seed layer with the conductive polymer as evidenced by Rapoport et al. (5,298,687) with the expectation of achieving similar results, i.e. a conformal, continuous conductive coating.

Chen (6,277,263) in combination with Rapoport et al. (5,298,687) fail to teach the thickness of the conductive polymer seed layer being from 50-1500 angstroms

Applicant's admitted state of the art (specification, pg. 2), under the heading, background of the invention, details that it is known in the art to form seed layers with thicknesses from 50-1500 angstroms.

Therefore, it would have been obvious for one skilled in the art at the time the invention was made to have applied the seed layer with a thickness in the claimed range as evidenced by Applicant's admitted state of the art (specification, pg. 2) with the expectation of achieving similar success. Furthermore, it is the Examiner's position that the thickness of a coating layer, in this case the seed layer, is a "result effective" variable which can be optimized by one skilled in the art depending upon the desired final product produced.

Claims 5 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (6,277,263) in combination with Rapoport et al. (5,298,687) further in view of Applicant's

admitted state of the art (specification, pg. 2) still further in view of Jonas et al. (6,358,437 B1) and Cloots et al (6,340,496 B1).

Chen (6,277,263) in combination with Rapoport et al. (5,298,687) further in view of Applicant's admitted state of the art (specification, pg. 2) fails to teach the conductive polymer being an acetylene, aniline, pyrrole or thiopene.

Features described above are incorporated here.

Jonas et al. (6,358,437 B1) and Cloots et al (6,340,496 B1) both teach utilizing substituted conductive polythiophenes and polypyrroles for forming conductive coatings (abstract).

Therefore, it would have been obvious for one skilled in the art at the time the invention was made to have modified Chen (6,277,263) in combination with Rapoport et al. (5,298,687) further in view of Applicant's admitted state of the art (specification, pg. 2) conductive polymer seed layer with Jonas et al. (6,358,437 B1) and Cloots et al (6,340,496 B1) conductive polymers of polythiophenes and polypyrroles with the expectation of achieving similar success.

Response to Amendment

3. Applicant's arguments with respect to claims 1-7 and 27-33 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argued that Chen (6,277,263) teaches electroplating to "repair" the "seed layer" as opposed to using a conductive polymer as well as the conductive polymer of Rapoport et al. (5,298,687) being a "metal filled" polymer.

Applicant's arguments are not commensurate in scope with the claims. The claims are not limited to a conductive polymer which is not "filled with metal" as detailed in the prior art. If Applicant were to amendment the claims to recite the specific polymers and to recite that the polymers are not "filled" with metal particles as the "seed material", the Examiner will reconsider his position. However, the Examiner reserves the right to require further search or consideration for such amendments.

Applicant argued the clamed thickness was not taught.

Applicant's admitted state of the art (specification, pg. 2), under the heading, background of the invention, details that it is known in the art to form seed layers with thicknesses from 50-1500 angstroms.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K Talbot whose telephone number is (703) 305-3775. The examiner can normally be reached on Monday-Friday 6AM-3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3775.

B K Talbot

Brian K Talbot
Primary Examiner
Art Unit 1762

BKT
April 1, 2004